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NEW METHODS FOR INVESTIGATING THE POTATO NEMATODE

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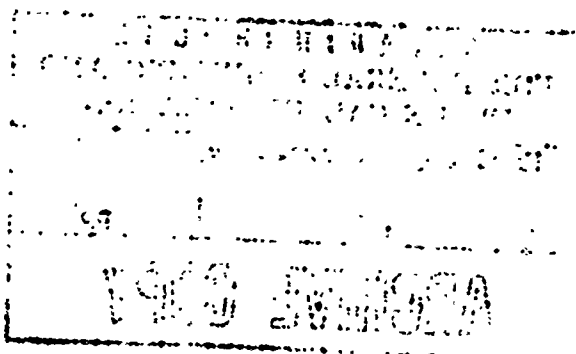
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## NEW METHODS FOR INVESTIGATING THE POTATO NEMATODE

[ Following is the translation of an article by V. I. Belokurskaya, Quarantine Laboratory, Vil'nyus, published in the Russian-language periodical Zashchita Rasteniy ot Vreditel'ey i Bolezney (Protection of Plants from Pests and Diseases), No 6, 1963, pp.41-42. Translation performed by Sp/6 Charles T. Ostertag Jr. ]

In our laboratories in 1958-1961 we checked already known methods and developed new methods in analyzing soil probes for the appearance of the potato nematode. Nine methods of isolating cysts from the soil were checked. Out of these, three turned out to be the most effective. We will present a brief description of these three.

Samples of soils arriving for analysis are thoroughly dried up to an air-dry condition (if they are not sufficiently dry) in the air (14-21 days) or in an incubator (24-32 hours at a temperature no greater than 40°). Particular attention must be paid to loamy soils. During drying it is recommended that they be thoroughly mixed and well broken up.

Method 1. Extraction of cysts from the soil in a Fenwick vessel (figure 1). Soil (100g) is placed into a strainer (A) (diameter of mesh 2-3 mm), which is inserted into a funnel (B), and washed with a water spray. The suspension runs off into the vessel (G) where it stands (no less than two minutes) so that the cysts come to the surface. Then the vessel (G) is filled to the top with water, the cysts run over the edge into the tray (V), and from there into the strainer (D) (diameter of mesh 0.1-0.2 mm). From the strainer (D) the cysts are washed off on to filter paper enclosed in the funnel. Then the paper is withdrawn, smoothed out on a glass and examined under a magnifying glass. The viability of cysts detected is checked under a microscope.

The effectiveness of this method of calculation is 93-97%. The analysis of one test is performed in 8.3 minutes.

Method 2. A suspension of soil (100 g) is emptied into a liter chemical glass or a porcelain beaker, which is filled up to 3/4 the volume of the vessel, and thoroughly mixed. The suspension is left standing for 10-15 minutes and the light particles and cysts rise to the surface. The poured over suspension cannot be left standing for long, otherwise the cysts might become saturated with water and sink to the bottom.

The upper layer of water is poured off into a strainer (diameter of mesh 0.1-0.2 mm) and washed with a jet of water until turbidity disappears. The washed residue is transferred (washed off) from the strainer to filter paper inserted into a funnel. The filter can be replaced by a capron fabric, then the outlet of the funnel is covered with wadding, otherwise the water runs off very rapidly and the cysts accumulate on the bottom, not being successful in setting on the walls.

The effectiveness of the method is 90%, the duration of analysis -- 8.5 minutes.

Method 3. (developed by the author). A suspension (50g) is placed on silk milling netting which is inserted in a funnel in place of filter paper (figure 2). The funnel outlet is closed with a cork (Goffart, 1959). The soil is covered with water up to 3/4 the volume of the funnel, mixed and left standing for five minutes. The cysts which rise to the top gradually approach the walls of the funnel and settle on the silk netting. Heavy particles of soil sink to the bottom. The netting is carefully removed and transferred to a clean funnel with an open outlet. After the water runs out, the netting is spread out on a lusterless glass and examined. The effectiveness of the method is 96%. The analysis of a specimen takes 8.2 minutes.

The methods described were checked in 1961 in the Lithuanian SSR under industrial conditions. A provisional method was developed for selecting soil probes. The number of them in each sector depended on the area of the latter: Up to 300m<sup>2</sup> -- 7; 300-600 -- 15; 600-1000 -- 20; 1000-2000 -- 30; 2000-3000 -- 40; 3000-4000 -- 50; and 4000-5000 -- 60 tests.

Larger masses were divided into sectors of 0.5 hectares and 60 initial probes were selected from each (across 7-8 meters from a square 150-170 cm<sup>2</sup> at a depth of 10-15 cm). The initial tests were combined into one overall test and mixed thoroughly. From this, one average sample of 250-300 cm<sup>3</sup> was separated out (it was placed in little bags made of a closely woven fabric and provided with a label). Investigation by the method of selection and analysis of soil probes was checked on 13,000 local plots [sectors allowed for the personal use of farm workers, etc.] in areas that earlier were considered free from the potato nematode. As a result, foci were detected in 171 sectors (1.3% of those investigated) of 23 rayons in an area of 17.23 hectares.

Simultaneous with the method of sampling, a bite examination of the

potato for nematode infection was carried out on 104,919 local plots covering an area of 7,577 hectares. Foci were exposed in 33 of these (0.03%), mainly in quarantine regions.

During investigation by the new method the expenditure of facilities is 20 times less and the exposure of foci 5 times greater than in the bite examination. This is primarily due to the fact that in the sampling method it is possible to expose foci in the very beginning of infection. In addition to cysts of the potato nematode, cysts of other species of that genus were detected. This makes it possible to use the method of sampling and analyzing soil probes when studying the fauna of all the cyst forming nematodes.

In the past year 18,774 local plots were investigated which earlier did not have nematode foci. In 1494 of these (3.06%) on an acreage of 108 hectares the potato nematode was detected.

Figure 1 (page 41) Apparatus for analyzing soil probes.

- A. Strainer
- B. Funnel
- C. Vessel
- V. Tray
- D. Strainer

Figure 2 (page 42) Funnel with silk netting.

- 1. Glass funnel
- 2. Netting
- 3. Soil probe
- 4. Cork
- 5. Cylinder